Reprinted from the *Indian Medical Gazette*, Vol. XXXII
(No. 3, March 1897.)

CALF VACCINATION

IN

PRUSSIA.

BY

W. J. SIMPSON, M.D., M.R.C.P., D.P.H.

Reprinted from the *Indian Medical Gazette*, Vol. XXXII
(No. 3, March 1897).

CALF VACCINATION IN PRUSSIA.

By W. J. Simpson, M.D., M.R.C.P., D.P.H.

Calf vaccination in India, and especially in Bengal, is in need of reform, and with the object of showing in what direction that reform could best be carried out, I republish in the *Indian Medical Gazette* my paper on calf vaccination in Prussia, which appeared in the *British Medical Journal* of October 10th. The paper is not intended to advocate the preservation of calf lymph in glycerine which, as has been shown by Surgn.-Lieut.-Col. W. G. King, is unsuitable for India, but a better system and greater care in the preparing of calf vaccine.

At a time when much public attention is directed towards vaccination against small-pox owing to the lesson conveyed by the catastrophe which has befallen Gloucester by its adherence to the teachings of anti-vaccinators, it occurs to me that a description of the Prussian system of calf vaccination as seen by me while on a short visit to Berlin would be of interest. There can be little doubt that anti-vaccinators

have secured the sympathy, and sometimes co-operation, of many well-intentioned people by highly coloured descriptions of possible transference of diseases from child to child by means of human vaccine lymyh; and the antipathy of this class to vaccination is really not so much to the use of a protective vaccine lymph as to the present system of arm to arm vaccination and its possible effects. It is to this class, and probably to a wider one, that the employment of calf vaccination under such a system as that pursued in Prussia would appeal as a relief to their doubts and prejudices, and it is an important question for the Government whether it would not be wise in the interests of public health to introduce the necessary machinery into England, so that those at least who preferred vaccination with calf lymph could have their preference respected and granted. It seems to me that every public vaccinator in England should have in his possession at his vaccine station supplies of calf vaccine, and that the poor people who attend these stations should be allowed their choice as to whether their children should be vaccinated with animal or human vaccine. I know that much calf vaccine is prepared and animal vaccination performed by Dr. Cory, the able director of the Government Vaccine Institute in London, but the work accomplished in comparison with that required is extremely small; it might even be said to be microscopic in extent, and it is certain that, while the system is not recognised as a duty belonging to Government, it is impossible that much progress in the direction of the supply of calf vaccine can be effected. The necessary funds and machinery require to be provided, which is only likely to be done when the

Government recognise the important *rôle* in the opposition to vaccination played by removable causes, such as the dislike of a large number of parents to their children being vaccinated with lymph taken from another child, and the further dislike to lymph being taken from the ripe vesicles on their child and transferred to the arms of other children.

There are eight institutions in Prussia such as the one I am about to describe. The one I saw, and the oldest, is at "Viehhof Central," on the outskirts of Berlin. Dr. Koch kindly arranged for me a meeting with Dr. M. Schulz, the director of the institution, who, with much patience and courtesy, showed me everything connected with the institute. It is situated close to the cattle market and slaughter-house of Berlin, in an airy and clean locality, and the building devoted to the vaccine preparation consists of a cowshed and two other rooms. The cowshed is well lighted and well ventilated with eight compartments on each side for the calves. It is excellently paved and drained, and is cleansed by means of a hose attached to a hydrant on the premises. On the pavement of the compartments there is placed an additional flooring, consisting of wooden laths fixed on iron rails, which can be taken up regularly and thoroughly cleansed and dried. This movable floor is sufficiently high to permit of the pavement underneath being thoroughly cleansed out by the hose without disturbance of the animal. On the wooden floor straw is spread, which forms a soft bed for the animals. Adjoining the shed is a good-sized room for vaccinating the calves; it contains two tilting tables with straps and pads so arranged that the calves can be fixed to the tables with the least possible trouble and with comfort to the

animals. Next to this is another spacious room, in which the vaccine is prepared and put up in quantities suitable for storing.

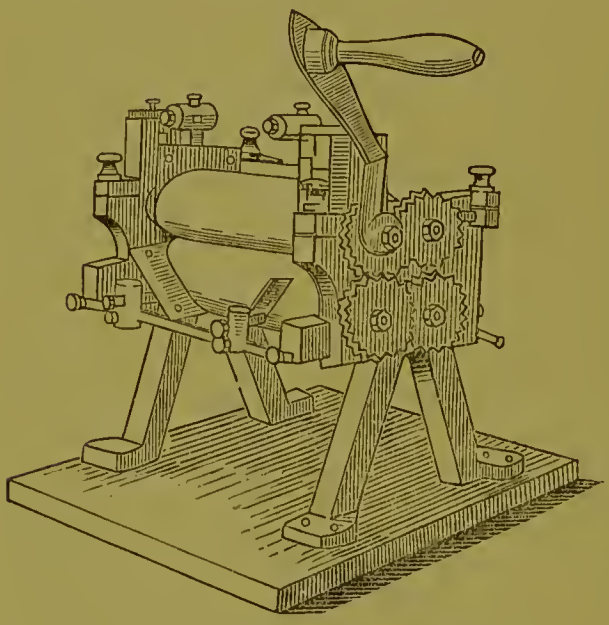
The calves are aged from 9 to 12 months, and cost 15 marks each. Females only are used, as they are cleaner and drier. There is no special preparatory quarantine insisted on, but a Government veterinary-surgeon examines the calves when brought by the contractor and rejects all that do not appear to him to be in perfect health. The passed animals are then sent to the institute; no animal is taken whose temperature is higher than 41° C. All calves are injected with 0·5 c.cm. of tuberculin, and the temperature taken twelve hours afterwards. They are kept in the stalls for twenty-four hours for the purposes of observation and rest, after which they are vaccinated. During the time the calves are kept at the institute they are fed on milk and eggs; each calf is fed three times a day, and at each meal it is given two eggs and nearly two litres of milk. The calf evidently relishes the eggs and takes the shell as well. An increase in weight is usually observed during their retention. To perform the vaccination, the animal is secured on the tilting table, and when properly fixed is shaved from abdomen to buttocks and on the inside of the thighs. The groins are not shaved, it being found that the hair there protects the vesicles on the thighs and sides of abdomen, and prevents them from being rubbed. After shaving, the parts are cleaned with soap and water, then disinfected with 1 to 1000 corrosive sublimate or 3 to 100 carbolic acid solution, and finally washed with boiled water and dried with a sterilised cloth. The instruments employed are first sterilised and then kept in alcohol. When required they are taken out and a light applied to them to

burn off the alcohol. Incisions as long as possible are made on the shaved parts, one set extending from the buttocks to the front part of the abdomen, the other set from the groin to the knee inside the thighs. These long incisions are preferred to smaller ones and to punctures or cross scarifications. It is found that they give more lymph and are less troublesome. After the incisions are made, an assistant stretches the parts and the lymph is spread over the incisions like butter over bread. The vesicles are usually ripe and ready for the removal of the lymph in 72 hours or may be 96 hours; occasionally, however, they are not ripe until 120 hours.

When the lymph is to be collected the calf is again fastened to the table, and the whole of the parts on which vesicles have appeared is cleansed with sterile water and soap, then dried with sterilised cloths, washed again with alcohol and dried again with sterile cloths. The lymph is then scraped off with a cup-shaped spoon, strong pressure being used on the instrument at the scraping, as this method ensures a greater freedom from blood than light scraping. The collected lymph is transferred at once to sterilised Petrie's dishes which have been previously tared (weighed). These are separately put on the balance, and to every part of lymph there is added 2 of sterilised water and 2 of glycerine. The glycerine used is that of Sarg of Vienna; it is very pure, and it is preferred to English glycerine, which has been tried, and which absorbs too much water and has too drying an effect on the lymph. The necessary proportions of glycerine and water having been added, the next step is to thoroughly mix them. This is done in a lymph mill or a mixer manufactured by Herr Julius Shober, 39, Adelbert Strasse,

Berlin. It consists of four porcelain rollers which are fixed to a small turning machine, and so arranged that whatever passes between them when they are working is thoroughly mixed and is collected in a small vessel below. The diagram shows the lymph mill.

The cost of the mill is M. 100. The thicker portion of vaccine is put through the mill first, and then the remainder of the water and the glycerine. After use the mill is thoroughly cleaned with hot water, and the porcelain rollers are kept in corrosive sublimate solution until next required.



Lymph Mill.

The glycerinised lymph, having been collected in the flask placed below the lymph mill, is put into small sterilised bottles of 50 c.cm. capacity,

and the bottles are closed by rubber corks which have been lying in a solution of corrosive sublimate. A label is put on to each bottle showing the number of the calf from which the lymph has been taken. These bottles are placed in an ice box and kept as stock. Under these conditions the lymph will keep good for at least a year. As the calf is slaughtered immediately it leaves the Institute and its condition noted, a check is maintained as to the state of health of the animal from which the vaccine is taken, and if the calf is not in perfect health as disclosed at the slaughter-house, the lymph can be destroyed and not used. Under this system there is no possibility of lymph from a diseased animal being used for vaccination purposes.

From the stock in the ice chest small tubes are filled when required. The tubes vary in size and contain sufficient lymph to vaccinate from 400 persons down to five. 1 c. cm. is found to be sufficient for 400 human vaccinations; 4 c. cm.'s are usually employed for a calf. When there were in Prussia only two institutes of this kind, one at Halle and the other in Berlin, as much lymph as would vaccinate half a million persons has been sent out from the Central Viehhoff in one year. Now that there are eight institutions the amount is much less. The tubes are placed in small wooden cylindrical boxes, and these are enclosed in stout official envelopes and are sent by post.

Infants in Prussia are vaccinated in four places on the right arm, four places being the minimum allowed. Children are vaccinated in four places on the left arm. Every scholar in a public or private school has to be revaccinated. Every soldier on entering the army has to be vaccina-

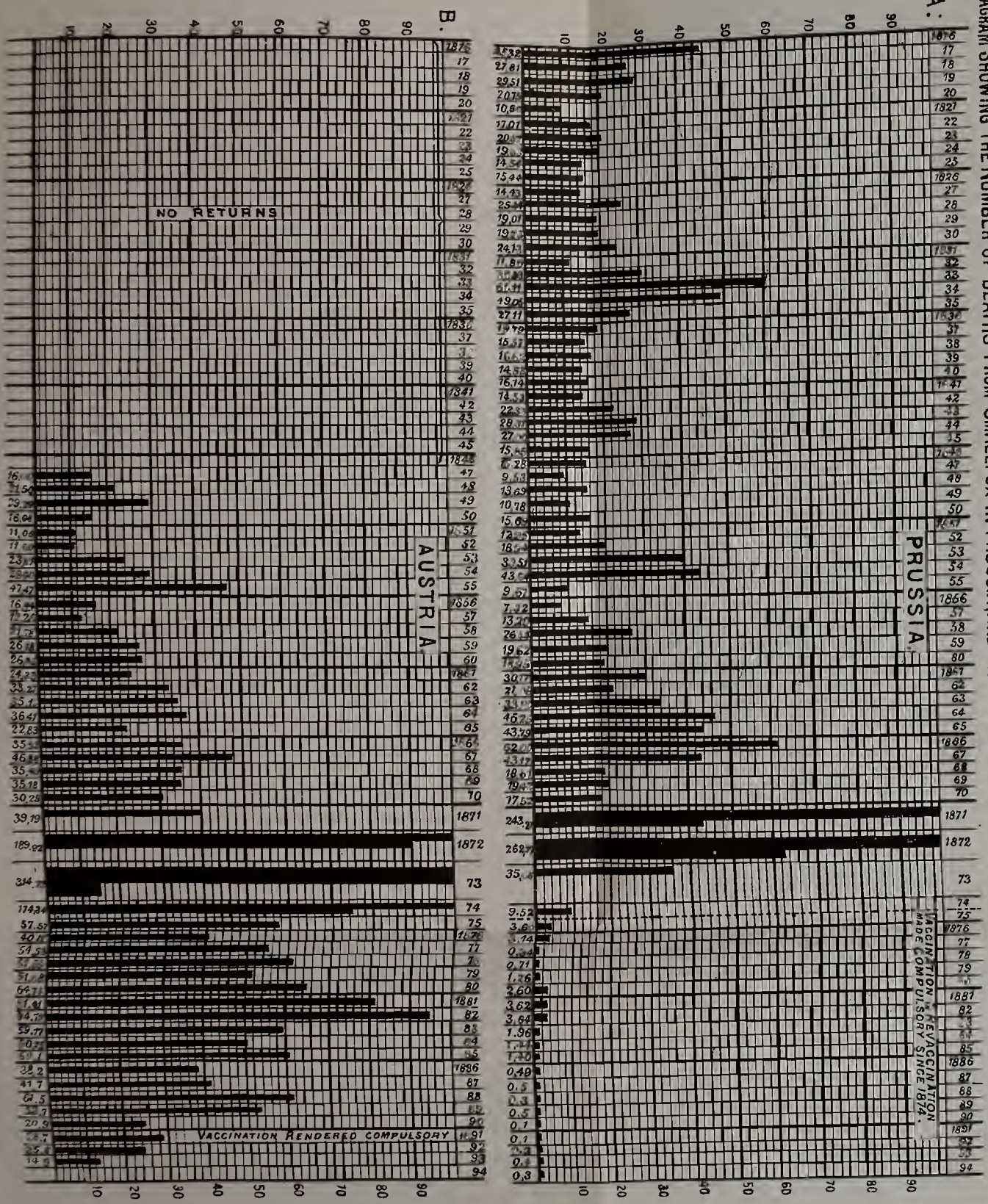
ted for the third time. The successes obtained by using calf vaccine is seen in the following statement:—

Berlin, June 15th, 1896.

Dear Dr. Simpson,—I am unable to comply with your request that I should give you a summary of our vaccination results according to the scheme sent by you. The number of incisions which must be made in Germany in the case of a child vaccinated for the first time is from six to ten, and in a revaccinated person from five to eight. Vaccination in one, two, three, or four places do not occur here. In the course of the present year, for the first time, the minimum number of incisions was fixed at four, and the results for this year will be tabulated for the first time in December. Only then shall I be able to send you reports as to the successful vaccinations in general. In Berlin and the province Brandenburg the successful first vaccinations amount to 95·24 per cent., and of revaccinations in children to 87·22 per cent. For military vaccinations our Institute has not in recent years sent out any lymph, I can therefore only give you information as to the results of other institutes. With the lymph supplied by the Königsberg Institute there were in the past year 46·19 per cent. and with that from the Stettin Institute 50·84 per cent. of successful results in the military revaccinations. The instructions as to the obtaining and distribution of the lymph will be found in my book on page 91.—I am, etc., Dr. M. Schulz.

The effect of the system is seen in the table comparing the prevalence of smallpox before and after its introduction into Prussia, and by a further comparison between the prevalence of small-pox in Prussia with such a system and in Austria with no compulsory vaccination.

DIAGRAM SHOWING THE NUMBER OF DEATHS FROM SMALLPOX IN PRUSSIA, AND AUSTRIA IN THE YEARS 1816 TO 1894 FOR EACH 100,000 LIVING.



Vacci ater